

CLAIMS

1. A rechargeable battery, comprising:
 - a cover having two ends, said cover having a plurality of contact openings, and a
 - 5 plurality of test openings;
 - a battery core, wherein said battery core having an outer shell and a top-side plate welded to said outer shell to seal said battery core, and said top-side plate having a terminal, a release valve, and a fill hole;
 - a battery protective circuit on a PCB, said PCB on a first side having contact
 - 10 points for making contact with said battery and test points for testing said battery, and said PCB on a second side having at least one contact structure for electrically conducting said battery protective circuit with said battery core, wherein said battery protective circuit is inserted in said cover; and
 - wherein said cover and said battery protective circuit are secured on to said
 - 15 battery core to form an integrated battery.
2. The claim as recited in claim 1 wherein said top-side plate has a 0.3 mm – 0.6 mm thickness.
- 20 3. The claim as recited in claim 1 where said battery protective circuit interacts with a safety unit connected between said battery core and said battery protective circuit, said safety unit providing a temperature detection function.

4. The claim as recited in claim 1 wherein said cover, said battery protective circuit and said battery core are elongated oval shaped.
5. The claim as recited in claim 2 wherein said cover, said battery protective circuit
5 and said battery core are elongated oval shaped.
6. The claim as recited in claim 1 where said cover is separately made from rubber or plastic using an injection molding method.
- 10 7. The claim as recited in claim 1 wherein there are position notches on the bottom of said cover and there are position holes on said top-side plate, wherein said position notches, when coupled with said position holes, positions said cover on to said battery core.
- 15 8. The claim as recited in claim 1 wherein there is a screw opening on each end of said cover and there is a screw holes on each end of said top-side plate; a screw fastens said cover onto said top-side plate using said screw opening and said screw hole.
9. The claim as recited in claim 1 wherein a structural support is placed between said
20 battery core and said battery protective circuit, wherein said structural support and said cover encasing said battery protective circuit.

10. The claim as recited in claim 9 wherein said top-side plate has a 0.3 mm – 0.6 mm thickness.

11. The claim as recited in claim 9 where said battery protective circuit interacts with
5 a safety unit connected between said battery core and said battery protective circuit, said safety unit providing a temperature detection function.

12. The claim as recited in claim 9 wherein said cover, said battery protective circuit and said battery core are elongated oval shaped.

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13. The claim as recited in claim 10 wherein said cover, said battery protective circuit and said battery core are elongated oval shaped.

14. The claim as recited in claim 9 where said cover is first made by rubber or plastic
15 using an injection molding method.

15. The claim as recited in claim 9 wherein there are position notches on the bottom of said cover and there are position holes on said top-side plate, wherein said position notches, when coupled with said position holes, positions said cover on to said battery
20 core.

16. The claim as recited in claim 9 wherein there is a screw opening on each end of said cover and there is a screw holes on each end of said top-side plate; a screw fastens said cover onto said top-side plate using said screw opening and said screw hole.

5 17. A rechargeable battery, comprising:

a cover having an elongated shape with two opposite ends, said cover having one or more contact openings, and one or more test openings;

a battery core having an elongated shape substantially matching the shape of said cover, wherein said battery core having a metal outer shell, and a top-side plate welded to
10 said outer shell to seal said battery core; wherein said top-side plate having a thickness of 0.3 mm – 0.6 mm and having disposed thereon a terminal, a release valve, and a fill hole;

a battery protective circuit on a PCB, said PCB on a first side having contact points for contacting said battery and test points for testing said battery, and said PCB on a second side having at least one contact structure for electrically conducting said battery
15 protective circuit with said battery core, wherein said battery protective circuit is inserted in said cover;

a structural support placed between said battery core and said battery protective circuit, said structural support and said cover encasing said battery protective circuit;

wherein said cover and said battery protective circuit are secured on to said
20 battery core to form an integrated battery; and wherein said battery core having positive and negative terminals connected to said battery protective circuit and, through said battery protective circuits, to said contact points exposed through said cover.

18. The claim as recited in claim 17 where said battery protective circuit interacts with a safety unit connected between said battery core and said battery protective circuit, said safety unit providing a temperature detection function.

5 19. The claim as recited in claim 17 wherein said cover and said structural support are connected by a hinge and said cover, said structural support and said hinge are injection molded as a single unit.

20. The claim as recited in claim 17 wherein there are position notches on the bottom
10 of said cover and there are position holes on said top-side plate, wherein said position notches, when coupled with said position holes, positions said cover on to said battery core.

21. The claim as recited in claim 17 wherein there is a screw opening on each end of
15 said cover and there is a screw holes on each end of said top-side plate; a screw fastens said cover onto said top-side plate via said screw opening and said screw hole.

22. A rechargeable battery, comprising:

a cover having an elongated shape with two opposite ends, said cover having one
20 or more contact openings, one or more test openings, and a securable cap;

a battery core having an elongated shape substantially matching the shape of said cover, wherein said battery core having a metal outer shell, and a top-side plate welded to

said outer shell to seal said battery core; wherein said top-side plate having a thickness of 0.3 mm – 0.6 mm and having disposed thereon a terminal, a release valve, and a fill hole;

a battery protective circuit on a PCB, said PCB on a first side having contact points for contacting said battery and test points for testing said battery, and said PCB on
5 a second side having at least one contact structure for electrically conducting said battery protective circuit with said battery core, wherein said battery protective circuit is inserted into said cover through the opening created by said cap;

a structural support integrated and injection molded with said cover and said cap, and disposed between said battery core and said battery protective circuit, said structural
10 support, said cover, and said cap encasing said battery protective circuit; and

wherein said cover and said battery protective circuit are secured on to said battery core to form an integrated battery; and wherein said battery core having positive and negative terminals connected to said battery protective circuit, and, through said battery protective circuit, connected to said contact points exposed through said cap.

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23. The claim as recited in claim 22 where said battery protective circuit interacts with a safety unit connected between said battery core and said battery protective circuit, said safety unit providing a temperature detection function.

20 24. The claim as recited in claim 22 wherein there are position notches on the bottom of said cover and there are position holes on said top-side plate, wherein said position notches, when coupled with said position holes, positions said cover on to said battery core.

25. The claim as recited in claim 22 wherein there is a screw opening on each end of said cover and there is a screw holes on each end of said top-side plate; a screw fastens said cover onto said top-side plate via said screw opening and said screw hole.

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